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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,495	07/06/2006	Hiroshi Kannan	SUGI0162	5126

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EXAMINER	
MCCALISTER, WILLIAM M	

ART UNIT	PAPER NUMBER
3753	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,495	KANNAN ET AL.	
	Examiner	Art Unit	
	WILLIAM MCCALISTER	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/1/006, 6/29/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention should read "... AND A METHOD...". . A new title is required which reflects this spelling correction.

Claim Objections

1. Claim 2 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The second claim's characterization of operational ranges as small and large is seen as broader than the operational limits set forth in claim 1, which require one valve to handle a maximum of 10% of the overall flow rate and a second valve to handle the rest.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 1 recites the limitation "flow rate controller" in line 6. There is insufficient antecedent basis for this limitation in the claim. For purposes of this communication it will be assumed that this limitation refers to a "flow controller" of line 2.

3. Claim 1 recites the limitation "the set flow rate" in line 6. There is insufficient antecedent basis for this limitation in the claim. For purposes of this communication it will be assumed that this limitation should read "a set flow rate".

4. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how, for example, the flow rate through one controller could be 10% of the overall flow rate, while the flow rate through another controller could be 100% of the overall flow rate.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Pfeiffer (PCT Publication WO01/96972).

With regard to claim 6, Pfeiffer discloses a method for internal pressure control of a chamber, comprising the steps of:

continuously operating (operational description at col. 1 lines 36-44) a vacuum pump (118) to decompress, through an exhaust line equipped with a conductance valve

(116), a chamber (102) supplied with a gas from a gas supply facility (114) equipped with a pressure type flow controller (112);

determining relationships between a gas supply flow rate and an internal pressure of the chamber at both the maximum degree and minimum degree of opening of the aforementioned conductance valve, respectively (col. 1 lines 44-51), to ascertain a control range for the gas supply flow rate to the chamber (col. 1 lines 56-60) and a control range of the internal pressure of the chamber (col. 1 line 61 – col. 2 line 7); and

regulating the gas flow rate, while supplying gas from the gas supply facility, to the gas supply flow rate corresponding to the internal pressure of the chamber to be set, determined from the relationship between the gas supply flow rate and the intemal pressure of the chamber, to maintain the chamber at the desired set pressure (col. 2 lines 7-14).

With regard to claim 7, Pfeiffer discloses a method for an internal pressure control of a chamber, comprising the steps of:

supplying a chamber (102) connected to both a gas supply facility (114) and an exhaust system (118) having a conductance valve (116); and

maintaining an internal pressure of the chamber at a set pressure by regulating both an opening of the conductance valve of the exhaust system and a supply flow rate of the gas supply facility (col. 2 lines 7-14).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1, 2, 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lull (US Patent Application Publication 2002/0179148) in view of Ohmi (US Patent 6,422,264), and further in view of Ohmi (US Patent 6,178,995).

With regard to claims 1 and 2, Lull discloses a gas supply facility for a chamber, comprising:

a plurality of pressure type flow controllers (SPLIT MFC A, SPLIT MFC B) connected in parallel;

a controller (210, 222, 226, 227) to control the operation of an aforementioned plurality of pressure type flow controllers; and

a chamber (160), wherein

the pressure type flow rate controller allows accurate flow control over a wide flow rate range by making one of the pressure type flow controllers to be a controller for a small flow rate, while the remaining pressure type flow controller controls the rest of the gas flow rate range (i.e. - a large flow rate range). (See example at column 7 lines 10-35.)

Lull does not disclose the chamber to be exhausted by a vacuum pump. However Ohmi '264 teaches that it was known in the art of semiconductor production at the time of invention to use a vacuum pump (VP) to discharge a process gas from a chamber. To discharge a process gas from Lull's chamber, it would have bee obvious to one of ordinary skill in the art at the time of invention to supplement Lull's system with the Omhi '264 patent's vacuum pump.

Lull does not disclose the flow controller to comprise an orifice, pressure detector, control valve, or computational control part as also required of the claim.

However, Ohmi '995 teaches a similar pressure type flow rate controller comprising an orifice (5), a pressure detector (3) provided on an upstream side of the orifice, a control valve (1) provided on an upstream side of the pressure detector, and a computation control part (6) wherewith a gas flow rate Qc passing through the orifice is computed with pressure P 1 detected by the pressure detector using a formula Qc=KP 1 (see abstract), and a difference Qy with the set flow rate Qs is output to a control valve as a driving signal (see abstract), thereby maintaining the ratio P1/P2, of a pressure P1 on the upstream side of the orifice and a pressure P2 on the downstream side, as approximately two or more (see column 8 lines 29-38). Ohmi '995 teaches this device to permit control of the flow rate of gases with very high precision over the whole process, without causing transient phenomena such as the overshooting of feeding gases. In order to permit similar control of the flow rate of gases in Lull's system, it would have been obvious to one of ordinary skill in the art at the time of invention to substitute Ohmi '995's flow controllers for those of Lull.

Neither does Lull disclose the small flow rate range to be up to 10% of the maximum flow rate to be supplied to the chamber. However, Lull discloses the small flow rate range to be adjustable (see column 7 lines 10-35). It therefore would have been obvious to one of ordinary skill in the art at the time of invention to set the small flow rate range to be up to 10% of the maximum flow rate, where the specific operational circumstances require such a performance characteristic.

With regard to claim 3, Lull discloses the invention as claimed, with exception to the specific flow rate ranges required. However, Lull discloses the small flow rate range to be adjustable (see column 7 lines 10-35). Therefore, where the specific operational circumstances require such performance characteristics, it would have been obvious to one of ordinary skill in the art at the time of invention to set one pressure type flow controller, for a small flow quantity, to be 0.1-10% of the maximum flow rate, while a flow rate range of another pressure type flow controller, for a large flow quantity, is set to be 10-100% of the maximum flow rate.

11. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lull in view of Ohmi '264, and Ohmi '995, as applied to claim 1 above, and further in view of Carter (US Patent 5,875,817).

With regard to claim 4, Lull, Ohmi '264 and Ohmi '995 disclose the invention as claimed except for the sequential operation of the flow controllers. However, Carter teaches that, in order to approximate a continuous flow curve, it was known in the art at the time of invention to operate a plurality of pressure type flow controllers by incrementally increasing the overall flow rate, where the step size along such a flow curve corresponds to the lowest flow rate of any of the flow controllers (see column 2 line 67-column 3 line 9). This implies that the flow controller with the smallest associated flow rate is opened first. To approximate a continuous flow curve in the operation of Lull's device, and thereby avoid pressure surges downstream of the flow controllers, it would

have been obvious to sequentially operate the flow controllers, as taught by Carter, starting with a pressure type flow controller for a smaller flow quantity range to one for a larger flow quantity, in turn, by means of control signals remitted from a signal conversion part (Lull's element 210) in the controller.

With regard to claim 5, Carter teaches a rising rate setting mechanism of control signals to be remitted to said pressure type flow controllers allotted for all the flow rate ranges of the flow controllers (see reference to continuous flow curve, at column 2 line 67-column 3 line 9), and said pressure type flow controllers supply the set flow rate of gas after a specified lapse of time following the remittance of the aforementioned control signals (a response time is inherent to the operation of flow controllers).

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pfeiffer as applied to claim 6 above, in view of Ohmi '995, and further in view of Lull.

Pfeiffer discloses a method for an intemal pressure control of a chamber as claimed in Claim 6.

Pfeiffer does not disclose the flow controller to comprise an orifice, pressure detector, control valve, or computational control part as also required of claim 8. However, Ohmi '995 teaches a similar pressure type flow rate controller comprising an orifice (5), a pressure detector (3) provided on an upstream side of the orifice, a control

valve (1) provided on an upstream side of the pressure detector, and a computation control part (6) wherewith a gas flow rate Qc passing through the orifice is computed with pressure P 1 detected by the pressure detector using a formula Qc=KP 1 (see abstract), and a difference Qy with the set flow rate Qs is output to a control valve as a driving signal (see abstract), thereby maintaining the ratio P1/P2, of a pressure P1 on the upstream side of the orifice and a pressure P2 on the downstream side, as approximately two or more (see column 8 lines 29-38). Ohmi '995 teaches this device to permit control of the flow rate of gases with very high precision over the whole process, without causing transient phenomena such as the overshooting of feeding gases. It would have been obvious to one of ordinary skill in the art at the time of invention to add Ohmi '995's orifice, pressure detector, and computational control part to Pfeiffer's flow rate controller, and to operate this combinatorial flow rate controller as taught by Ohmi '995, to precisely control the flow rate of gases in Pfeiffer's system without causing transient phenomena, as taught by Ohmi '995.

Neither does Pfeiffer disclose a plurality of flow controllers of the type required by claim 8, or a controller to operate the plurality of flow controllers, as required by claim 8. However, Lull teaches that, to supply fluid to a process chamber, it was known in the art at the time of invention to employ a similar method wherein a gas supply facility comprises:

a plurality of pressure type flow controllers (SPLIT MFC A, SPLIT MFC B) connected in parallel; and

a controller (210, 222, 226, 227) to control the operation of an aforementioned plurality of pressure type flow controllers, which comprises

an input setting part (222) to set a gas flow rate to be supplied to a chamber, and

a signal conversion part (226, 227) to convert an input value to the said input setting part into control signals to pressure type flow controllers, thus making it possible to accurately control flow rate control over a wide flow rate range by remitting control signals from a signal conversion part to all the pressure type flow controllers,

wherein the pressure type flow rate controller allows accurate flow control over a wide flow rate range by making one of the pressure type flow controllers to be a controller for a small flow rate, while the remaining pressure type flow controller controls the rest of the gas flow rate range (i.e. - a large flow rate range). (See example at column 7 lines 10-35.)

To supply fluid to Pfeiffer's process chamber, it would have been obvious to one of ordinary skill in the art at the time of invention to provide a plurality of flow controllers, a signal conversion part, and an input setting part, as taught by Lull, to increase the precision of flow rate control. Additionally, it would have been obvious to one of ordinary skill in the art at the time of invention to set the small flow rate range to be up to 10% of the maximum flow rate, where the specific operational circumstances require such a performance characteristic.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM MCCALISTER whose telephone number is (571)270-1869. The examiner can normally be reached on M-R, 8-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Huson can be reached on 571-272-4887. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Stephen M. Hepperle/
Primary Examiner, Art Unit 3753

WMM
5/30/2008